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## **REMARKS**

### **Allowable Subject Matter**

In the September 22, 2004 Office Action, claims 33-35, 38 and 48 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### **Rejoinder of Method Claims**

In the June 15, 2004 Office Action, the Examiner imposed a restriction requirement against claims 1-49, and required that an election be made between:

Group I:            Claims 1-31 and 49, drawn to a method of forming a nitride, classified in class 438, subclass 758; and

Group II:           Claims 32-48, drawn to a precursor, classified in class 524, subclass 86.

Applicants elected Group II claims 32-48 and request that when the product claims 32 to 48 are found allowable, all claims that recite a method of making or using the product be rejoined and be examined under the provisions of MPEP §821.04. Such rejoinder would be fully proper under these circumstances because when the product claim is found allowable, applicant may present claims directed to the process of making and/or using the patentable product for examination through the rejoinder procedure in accordance with MPEP §821.04, provided that the process claims depend from or include all the limitations of the allowed product claims. In the present application, the elected claims 32-48 are directed to a metalorganic precursor and claims 1-31 are directed to a process for using such precursor  $(R_1R_2N)_{a-b}MX_b$ . Thus, consistent with the provisions of the MPEP §821.04, when the product claims 32-48 are found allowable, the withdrawn method of use claims 1-31 may be rejoined for examination.

### **Rejections of Claims and Traversal Thereof**

In the March 9, 2005 Office Action,

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claims 32, 33, 34 and 39 were rejected under 35 U.S.C. §102(e) as being anticipated by Lei, et al. (U.S. Patent No: 6,552,209); and

claims 35-38, 40-48 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lei, et al.

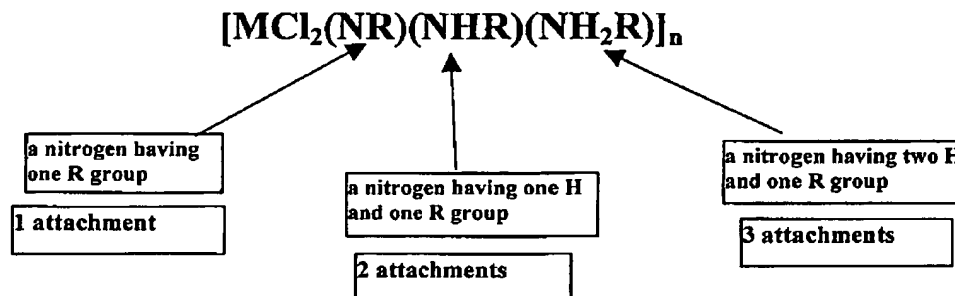
Applicants respectfully traverse these rejections and submit that the presently claimed invention is not anticipated by the cited reference.

**Rejection under 35 U.S.C. §102(e)**

According to the Office:

"Lei, et al disclose transition metal metallorganic complex compounds of the formula shown in col. 1, lines 50-65 which are precursors for deposition. In the formula, the metal may be tantalum, among others, (col. 1, lines 64-67). The formula reads on the formula given in claim 32, formula I."

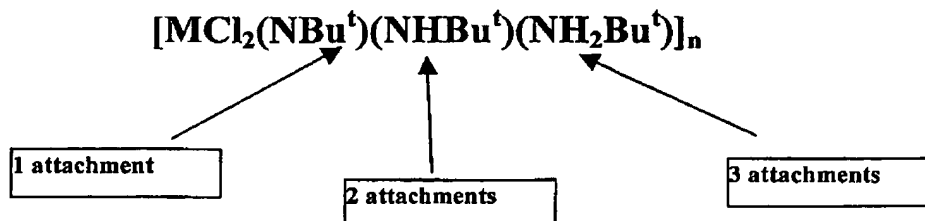
Applicants vigorously disagree. Initially, it should be noted that the formula of the cited reference is as follows, wherein R can be alkyl, cycloalkyl, aryl, alkenyl, cycloalkenyl or  $\text{NR}^a\text{R}^b$ :



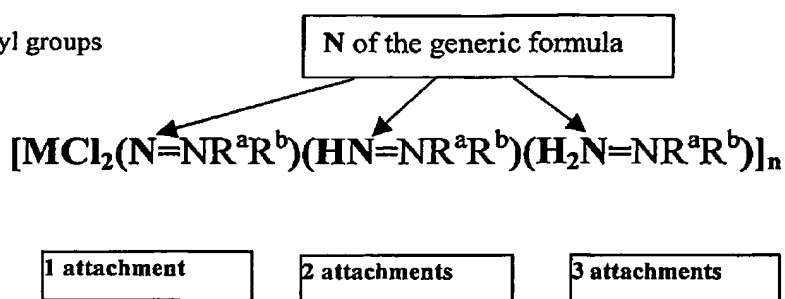
Thus, this formula includes a metal (which can be Ta), two halogens that are chlorides, and three nitrogen-containing groups including: a nitrogen having one R group, a nitrogen having one H and one R group, and a nitrogen having two hydrogens and one R group.

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One of the examples set forth in the cited reference shows this formula with the inclusion of a tert-butyl "Bu<sup>t</sup>" group as shown below:



Another disclosed example includes the addition of a dimethylhydrazine wherein  $\text{R} = \text{NR}^a\text{R}^b$  and  $\text{R}^a$  and  $\text{R}^b$  are methyl groups



Clearly, each of the nitrogen-containing groups has a different number of attachments. The cited Lei, et al. formula is entirely different from applicants' claimed invention, which is shown below.

32. A metalorganic precursor of formula (I):



wherein:

M is selected from the group of Ta, Ti, W, Nb, Si, Al and B;

a is a number equal to the valence of M;

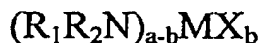
$1 \leq b \leq (a-1)$ , with the proviso, that when M is Si, then b is 1 or 2;

$\text{R}_1$  and  $\text{R}_2$  can be the same as or different from one another, and are each independently selected from the group of H,  $\text{C}_1\text{-C}_4$  alkyl,  $\text{C}_3\text{-C}_6$  cycloalkyl, and  $\text{R}^0\text{Si}$ , where each  $\text{R}^0$  can be the same or different and each  $\text{R}^0$  is independently selected from H and  $\text{C}_1\text{-C}_4$  alkyl; and

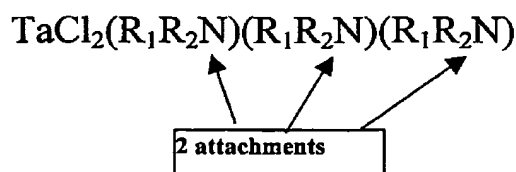
X is selected from the group of chlorine, fluorine, bromine and iodine.

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Applicants' formula I has a multiplicity of N containing groups  $(R_1R_2N)_{a-b}$ , depending on the valance of the metal and the number of halogens attached thereto, and wherein each N of the nitrogen containing group has 2 attachments.



Thus, if the metal is tantalum and the molecule has two chlorides, such as required by the prior art, applicants' molecule would be as follows:



Notably, each of the nitrogen-containing groups include two attachments.

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. *Lindermann Maschinenfabrik GMBH v. American Hoist and Derrick Co.*, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984) (emphasis added). The Lei et al. reference does not meet this standard.

Lei et al. does not disclose every limitation of applicants' claimed invention, and as such, Lei et al. does not anticipate applicants' claimed invention. Accordingly, applicants respectfully request withdrawal of the rejection of claims 32, 33, 34 and 39 under 35 U.S.C. §102(e).

#### Rejection under 35 U.S.C. §103(a)

According to the Office:

"Although Lei et al does not reach the recited compounds explicitly, Lei et al renders the recited compounds obvious because Lei et al discloses that other transition metals may be used other than Ta (col. 3, lines 25-35). In addition, Lei et al discloses that the groups may be silylalkyl, so that the compounds in claims 38 and 40 would have been obvious to one of ordinary skill in the art in view of Lei et al. (col. 3, lines 50-62). In addition, one of the reagents is a compound which reads on formula II in claim 47 (col. 3, lines 14-18). Therefore, it would have been obvious to

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one of ordinary skill in the art at the time of the invention to have developed the formulas in the rejected claims in view of the disclosure made by Lei et al. because these can be derived from the teachings of Lei et al. as pointed out above."

Applicants submit that the Lei et al. reference does not render applicants' claimed invention obvious. Initially, as stated above, the discussion as set forth at column 1, lines 50-65 of Lei et al. does not disclose, teach or suggest applicants' claimed invention. Further, there is no motivation to go in the direction of applicants' claimed invention. Instead, the precursor set forth in Lei et al. has three separate nitrogen-containing groups and each of these three different groups has a different number of attachments. There is no suggestion or teaching in this reference that would provide guidance to abandon the described molecule with the three different nitrogen-containing groups having a different number of attachments and construct a precursor molecule wherein each of the nitrogen containing groups has exactly two attachments.

It is incumbent on the Office to provide some suggestion or teaching in the prior art that would lead one skilled in the art to proceed in the direction of applicants' claimed invention. The Office in this case has not provided any objective or specific teachings or suggestions in the cited prior art to motivate one skilled in the art to modify the Lei, et al. precursor. What is the basis of motivation to change the number of attachments in the nitrogen-containing groups? The Courts have addressed the general criterion of this issue numerous times, and have stated that "[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Mills*, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). Clearly, Lei et al. does not suggest a precursor wherein each of the nitrogen containing groups has exactly the same number of attachments. Thus, the Office seems to be merely reinterpreting the prior art in light of the applicants' disclosure, in order to reconstruct the applicants' claimed invention, but without any instructional or motivating basis in the reference itself. Such approach is improper and legally insufficient to establish any *prima facie* case of obviousness.

Importantly, it should be recognized that the text cited by the Office at column 1, lines 50-65 was included in Lei et al. to discuss a known deficiency in the prior art. Specifically, Lei et al. states that any precursor that includes a halogen is a problem because it can leave behind a halide residue in the metal nitride film that can lead to corrosion and other long-term stability problems (see col. 1, lines 43-46). Thus, why would one skilled in the art, after reading Lei et al. even consider using a precursor that

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included halogen. The Court in *In re Gurley*, 31 USPQ 2d 1131 (Fed. Cir. 1994) addressed this very issue and stated:

"[I]n general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant. See *United States v. Adams*, 383 U.S. 39, 52, 148 USPQ 479, 484 (1966) ("known disadvantages in old devices which would naturally discourage the search for new inventions may be taken into account for determining obviousness.")"

Clearly, the statement in Lei et al. regarding the problems of halogen containing precursors would not suggest to one skilled in the art to go in the direction of applicants' claimed invention.

The Lei et al. group certainly went in an entirely different direction as described at column 3, lines 50 to the bottom of the column. Notably, the new precursors of Lei et al. are metal imino/amino complexes that do not include any halogens as shown below:



or



It is very noticeable, that the precursors described in the description text of Lei et al. do not contain any halogens. Lei et al. goes to great lengths to remove all halogens from the molecules by reacting the intermediate complex, containing a halogen, with a lithium amide to form the imino/amino complexes that are devoid of halogens (see column 4, lines 10-35).

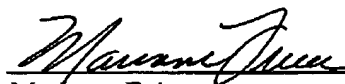
In light of the above discussion and the fact that (1) there is no motivation, suggestion or teaching to modify the cited reference; and (2) each and every recited limitation of applicants' claimed invention are not disclosed or suggested in the cited reference; applicants submit that the cited reference does not provide the necessary disclosure, teaching or suggestion to establish a *prima facie* case of obviousness. Accordingly, applicants respectfully request that the rejection of claims 35-38, 40-48, on the basis of obviousness, be withdrawn.

#### CONCLUSION

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Applicants have satisfied the requirements for patentability. All pending claims are free of the art and fully comply with the requirements of 35 U.S.C. §102 and §103. It therefore is requested that Examiner Everhart reconsider the patentability of the pending claims in light of the distinguishing remarks herein, and withdraw all rejections, thereby placing the application in condition for allowance. Notice of the same is earnestly solicited. In the event that any issues remain, Examiner Everhart is requested to contact the undersigned attorney at (919) 419-9350 to resolve same.

Respectfully submitted,



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